

Government certification and IPO underpricing: Evidence from A-share listed enterprises in China

Abstract

Based on a sample of 1,315 IPOs in the Chinese stock market from 2019 to 2023, this paper finds that government certification of "Specialized and Sophisticated Enterprises" can reduce the underpricing rate of IPOs for enterprises, especially for small and medium-sized enterprises. By distinguishing the level of government certification, we find that central government certification of "Little Giants" can reduce the underpricing rate more than local government certification. The results are proven to be valid by a series of robustness checks and we find no heterogeneous effects between subsamples classified by firm characteristics and local economic development.

Keywords: IPO underpricing; Information asymmetry; Government certification; Small and Medium-sized Enterprises

JEL classification: G14; G18; G32

1. Introduction

IPO underpricing refers to the phenomenon that the issue price of an IPO is much lower than the closing price on the first day. IPO underpricing is anomaly against the efficient market hypothesis (Banerjee et al., 2011; Wang et al., 2023), and may cause a mismatch of resources and creates a malfunction between the primary and secondary markets (Peng et al., 2022). In China, IPO underpricing is more severe than in developed countries (Cheung et al., 2009; Tian Li, 2011).

Information asymmetry is one of the main reasons leading to IPO underpricing (Ljungqvist, 2007). There are several scenarios of information asymmetry in the stock market that can lead to IPO underpricing: the first scenario is the "winner's curse" (Rock and Kevin, 1986): overvalued stocks are purchased by investors with inferior information, IPO underpricing is the process by which an issuer compensates for information disadvantage in order to make a successful offering to investors who are not well-informed; Second, value uncertainty also exists between the issuing firm and the investor (Loughran and Ritter, 2004); Finally, according to Baron and Holmström (1980) and Baron (1982) , IPO underpricing can also be due to

information asymmetry between the issuing firm and intermediary underwriters: underwriters have an incentive to use their information superiority to earn commissions at a low cost, so it is optimal for firms to accept the underpricing in order to secure the issue.

China has undergone several rounds of stock market reforms since the 1990s, including the recent reform of the registration-based IPO system initiated in 2018, since which the IPO first-day change limits have been gradually removed¹. Thus, there are different patterns of IPO underpricing among board markets and different roles of the government in the stock market (Li & Li, 2022; Pan et al., 2024). One of the key policies of the Chinese government to support local enterprises, especially small and medium-sized enterprises (i.e., SMEs), is the "Specialized and Sophisticated Enterprises" certification. The central and local governments certify some enterprises as "Specialized and Sophisticated Enterprises" (hereinafter referred to as SSE), and those applying for certification must have an average year-on-year growth rate of at least 5% in their main business revenue or net profit over the past two years, and the ratio of liabilities to assets should not exceed 70%. The top performers with outstanding achievements are called "Little Giants", certified by the central government and characterized by their focus on niche markets, strong innovation capabilities, large market shares, and strengths in core technologies (Ministry of Industry and Information Technology of PRC, 2022).

Government certification can affect IPO underpricing by reducing information asymmetry through: First, the signaling effect. The certification signals the intrinsic value of enterprises to the market, thereby reducing information asymmetry; Second, similar as the certification effect of the underwriters (Booth and Smith, 1986), by being certified as SSE certifies R&D capability and future development prospects of the enterprises. Among all enterprises, SMEs may face a higher underpricing rate at the time of listing due to the scarcity of historical information and hence more severe information asymmetry compared to firms with large asset sizes and revenues (Dhamija and Arora, 2017).

This study contributes to the literature by providing a policy analysis of how SSE certification affects the IPO underpricing from the perspective of information asymmetry theory. This study also distinguishes the effect of certification from different levels of government and verifies that these effects are not heterogeneous across subsamples with different characteristics, providing new perspectives on how to reduce IPO underpricing at the government level.

This study is structured as follows: Section 2 proposes three hypotheses;

¹ The registration-based IPO reform was initiated in 2018 and successively adopted by the SSE STAR Board in July, 2019, the Second Board in August, 2020, and the Beijing Stock Exchange in November, 2021. Finally, the reform has been implemented in every stock market in China since February 2023. The reform introduced a new rule to remove the daily limit on price movements during the first five trading days after an IPO.

Section 3 illustrates the research design; Section 4 reports the empirical results of baseline regression and further analysis; Section 5 concludes the study with policy implications.

2. Hypotheses development

As mentioned above, SSE certification can reduce the underpricing of certified companies by filling the information gap, and more so among SMEs. Therefore, the first hypothesis is proposed:

H1: There is a negative correlation between government certification and the IPO underpricing rate, with firms that receive government certification having a lower underpricing rate, and the effect is more significant for SMEs.

SSEs are evaluated and certified at the provincial or municipal level first, and some of them are reported to the Ministry of Industry and Information (MIIT), which announces a batch of “Little Giants” every year. The MIIT is under the State Council, so it can be said that the “Little Giants” enterprises have been certified by the central government. According to Su Kun (2016), the impact of different levels of government on enterprises varies. Thus, the higher the government level of certification, a more significant impact on IPO underpricing is expected. So here is the second hypothesis:

H2: The higher the level of government certification, the greater the reduction in IPO underpricing.

Government certification tends to mitigate IPO underpricing by reducing information asymmetry, so that intrinsic indicators already present in the firm, such as return on assets, sales growth, and also the age of the firm at the time of listing, should not affect the impact of government certification on IPO underpricing. Certifications from regions with different levels of economic development should also not have a heterogeneous impact on reducing underpricing because there are clear and uniform criteria for certifying SSE. Thus, here is the third hypothesis of the heterogeneity of this study:

H3: There is no heterogeneity in the effect of certification on IPO underpricing across firms in terms of age at IPO, return on assets, sales growth, and economic development of the region where the government provides certification.

3. Research Design

3.1 Data

The sample selected for this paper is shares of enterprises listed on all A-share boards from the registration-based reform policy pilot in 2019 to September 30, 2023 with no limit on the first day's price change rate². The

² That is, all enterprises that have been listed on the Sci-Tech Innovation (SSE STAR)

data are obtained from prospectuses and annual reports of the listed enterprises, and Wind Financial Database.

3.2 Measurements of variables

(1) IPO underpricing rate (first-day price change rate)

The IPO underpricing rate is the increase or decrease of the closing price on the first day of IPO compared to the offering price, as shown in (3-1):

$$UP_i = \frac{P_{i,1} - P_{i,0}}{P_{i,0}} (3-1)$$

Where UP_i represents the underpricing rate measured by first-day price change rate, $P_{i,1}$ represents the closing price of sample firm i on the first day of the IPO, $P_{i,0}$ represents the issue price of sample firm i .

In addition, to exclude the influence of market sentiment, the market-adjusted first-day return, which represents the "excess return" over the market (Zhang et al., 2014), is also used as a measure and for the robustness check in Section 4.3, as shown in (3-2):

$$aUP_i = UP_i - Market_i (3-2)$$

where aUP_i represents the adjusted first day's price change rate, $Market_i$ represents the price change of the market index of the board where sample firm i is located on the same day.

(2) Government certification

To distinguish different administrative levels of certification governments, we constructed three dummy variables:

If there is at least one certification of SSE in the firm's prospectus, IPO_C is assigned to the value of 1 regardless of the level of government that grants it, otherwise 0; If the firm has obtained the national "Little giants", then the variable for national certified IPO_{NC} is 1, otherwise it is 0; if the firm has obtained the provincial/municipal certification only, then the variable IPO_{local} is

Board since July 22, 2019, the Beijing Stock Exchange since September 3, 2021, the Second Board since August 24, 2020, and the Main Board since March 29, 2023

1, otherwise it is 0.

(3) Control variables

To improve the estimation efficiency and reduce the error, the firm and IPO characteristic variables are introduced as control variables, and the explanation of each is shown in Table 1.

Table 1

Definition of variables

Variable	Definition
UP	IPO underpricing rate, increase/decrease in issue price compared to the closing price on the first day of trading Dummy variable, if a firm is certificated as an SSE,
IPO_C	regardless of national or provincial/municipal, $IPO_C = 1$, otherwise $IPO_C = 0$
IPO_{NC}	Dummy variable, if a firm is certificated as a national SSE, i.e., Little Giant before listing, then $IPO_{NC} = 1$, otherwise $IPO_{NC} = 0$
$IPO_{\textcolor{red}{c}}$	Dummy variable, if a firm has only obtained a provincial/municipal SSE certification before listing, then $IPO_{\textcolor{red}{c}} = 1$, otherwise $IPO_{\textcolor{red}{c}} = 0$
$Asset$	Firm asset size, total assets at the end of the fiscal year prior to listing*
EPS	Earnings per share for the fiscal year prior to listing
$Leverage$	Leverage ratio, ratio of a firm's debt-to-equity (D/E) for the fiscal year prior to listing
$First_{holder}$	Shareholding of the largest shareholder at the time of the firm's IPO
$State_{own}$	Dummy of the corporate ownership, 1 if the real controller belongs to a central or local state-owned enterprise, otherwise 0
$Raise$	The size of the firm's IPO fundraising*
Tlu	Underwriter reputation, 1 if lead underwriter ranking is among the top 10, 0 otherwise
$PE_{industry}$	Prospectus disclosure of price-earnings ratios for the firm's industry

*: Natural log of variable value is taken in regressions.

3.3 Model Specification

Based on the variables constructed, baseline regression model (3-3) and (3-4) are designed to test **H1** and **H2** of this paper, i.e., the benchmark regression, respectively.

$$UP_{ijkl} = \alpha_0 + \alpha_1 IPO_{Ci} + \alpha_2 Controls_{ik} + b_j + \eta_k + \gamma_l + \epsilon_{ijkl} \quad (3-3)$$

$$UP_{ijkl} = \beta_0 + \beta_1 IPO_{NCi} + \beta_1 IPO_{\textcolor{red}{i}i} + \beta_3 Controls_{ik} + b_j + \eta_k + \gamma_l + \varepsilon_{ijkl} \quad (3-4)$$

Where UP_{ijkl} represents in industry k , the underpricing rate of firm i going public on board j in province l . $Controls_i$ represents a series of control variables in Table 1, b_j , η_k and γ_l represent board, industry and province fixed effect, ϵ_{ijkl} and ε_{ijkl} are the error terms.

4. Empirical Results

4.1 Summary statistics

Table 2 shows the descriptive statistics for the full sample and for the subsamples grouped by board market. For the underpricing rate (*UP*), the mean value is 113.1% and the median value is 64.46%, which are much higher than 44% of the first day's limit of the price change rate before the 2019 reform; the standard deviation is 160.5, which indicates that the level of the price change rate is widely distributed. Among the sub-samples, the underpricing rate of the Second and SSE STAR board market are higher, and the BSE has the lowest underpricing rate, and it is noteworthy that there are falls on the debut in each market. BSE and Main Board after the registration reform are the two markets with the highest proportion of listing of SSEs. For the control variables, the SSE STAR market exhibits higher growth and R&D intensity, as reflected in younger companies, the fastest sales growth in three years, and the highest percentage of R&D investment.

Table 2

Summary statistics for whole sample and sub-samples

Variable	Mean					Sd	Min	Max
	Whole	Main	Second	SSE	BSE			

	113.0	6	63.83	140.75	124.60	25.25	160.48	-36.04	1942.5	8
UP										
IPO_C	0.37	0.54	0.32	0.33	0.56	0.48	0.00	1.00		
IPO_{NC}	0.18	0.29	0.14	0.16	0.27	0.38	0.00	1.00		
$IPO_{\textcolor{red}{i}}$	0.19	0.25	0.18	0.17	0.29	0.40	0.00	1.00		
$Leverage$	36.97	46.52	37.72	35.84	37.10	17.24	2.77	97.42		
$Asset$	2.21	3.30	2.28	2.37	1.52	0.94	-0.54	7.44		
EPS	1.12	1.08	1.43	0.98	0.75	1.53	-10.49	22.11		
$First_{holder}$	33.95	44.62	36.92	30.37	35.00	14.74	0.00	89.99		
$State_{own}$	0.08	0.25	0.05	0.10	0.09	0.27	0.00	1.00		
$Raise$	1.91	2.58	2.02	2.34	0.53	0.98	-1.03	6.28		
Tlu	0.50	0.54	0.43	0.62	0.33	0.50	0.00	1.00		
$PE_{industry}$	35.50	24.96	35.49	39.47	26.60	16.06	0.00	147.21		

4.2 Baseline regression

Table 3 reports the results of the baseline regression. In Panel A, Columns 1-2 report the results of SSE certification IPO_C regardless of certification level with controls only and with controls and all fixed effects. We see that SSE certification significantly reduces the underpricing rate of IPO companies by about 32% after controlling for all variables. Column 3-4 report the results of IPO_{NC} and $IPO_{\textcolor{red}{i}}$. National-level certification has a more significant impact on reducing the underpricing rate, with a percentage of about 53%, while provincial and municipal-level certification has a much smaller effect of only about 26%. Therefore, the national “Little Giant” certification for enterprises is 105% more effective in reducing the underpricing rate than the provincial/municipal certification. According to the theories in Section 2, the possible explanation for this is that national certification reduces information asymmetry in the IPO market more by releasing stronger signals and providing more reliable certification. Panel B shows that for SMEs only, SSE certification reduces the underpricing rate by about 43%, 11% more than for the whole sample, which can be explained by the more severe underpricing among SMEs and also by the relevance of the SSE certification policy for SMEs.

The results confirm **H1** and **H2** in section 2. It is noteworthy that after controlling for fixed effects, the magnitude of the effects shows a significant

decrease. After further controlling for separate fixed effects, the board fixed effect is found to be the main contributor to the decrease. As mentioned in 4.1, firms listed in different board markets have significantly different characteristics, and there are also different IPO characteristic indicators among boards, including underpricing rate, first day turnover rate, and P/E ratio, etc. Therefore, it is necessary to control for the fixed effects to eliminate endogeneity.

Table 3
Baseline regression results

Dependent Variable:	(1)	(2)	(3)	(4)	
<i>UP</i>					
Panel A		All Enterprises			
<i>IPO_C</i>	46.91** *	32.34** *	-	-	
	(8.820)	(7.986)			
<i>IPO_{NC}</i>			64.42** *	53.35** *	
			(11.47)	(10.51)	
<i>IPO_i</i>			35.28** *	26.06** *	
			(10.99)	(10.14)	
<i>Leverage</i>	1.083** *	0.804** *	0.893** *	0.581** *	
	(0.277)	(0.244)	(0.273)	(0.248)	
<i>Asset</i>	50.24** *	52.37** *	37.89** *	33.26** *	
	(6.737)	(6.048)	(5.883)	(5.404)	
<i>EPS</i>	-4.973* (2.825)	-2.390 (2.506)	- (2.771)	- (2.513)	
<i>First_{holder}</i>	-0.308 (0.291)	-0.181 (0.265)	-0.272 (0.292)	-0.152 (0.273)	
<i>State_{own}</i>	5.050 (16.31)	38.11** (14.87)	8.303 (16.37)	40.69** (15.30)	
<i>Raise</i>	-	-	-	-	

	64.36**	129.7**	51.76**	101.8**
	*	*	*	*
	(5.892)	(6.299)	(5.270)	(5.688)
<i>Tlu</i>	8.765	10.22	8.317	8.844
	(8.838)	(7.865)	(8.890)	(8.110)
<i>PE_{industry}</i>	1.603**	1.089**	1.494**	1.073**
	*	*	*	*
	(0.271)	(0.275)	(0.273)	(0.284)
Fixed Effects	NO	YES	NO	YES
Observations	1,315	1,315	1,315	1,315
Panel B				
	SME only			
	-	-	-	-
<i>IPO_C</i>	59.11**	43.17**		
	*	*		
	(11.68)	(10.84)		
<i>IPO_{NC}</i>			72.14**	54.11**
			*	*
			(14.54)	(13.16)
<i>IPO_o</i>			45.99**	31.18**
			*	
			(14.57)	(13.59)
<i>Leverage</i>	-	-0.298	-	-0.291
	0.804**		0.791**	
	(0.384)	(0.351)	(0.383)	(0.351)
<i>Asset</i>	46.52**	23.52**	46.88**	23.79**
	*	*	*	*
	(9.629)	(8.762)	(9.624)	(8.757)
<i>EPS</i>	-	-	-	-
	9.704**	8.480**	9.486**	8.362**
	(4.488)	(4.000)	(4.487)	(3.998)
<i>First_{holder}</i>	0.0352	-0.134	0.0163	-0.150
	(0.421)	(0.394)	(0.421)	(0.394)
<i>State_{own}</i>	9.890	45.32*	10.07	45.26*
	(26.53)	(24.66)	(26.51)	(24.64)
<i>Raise</i>	-	-	-	-
	41.96**	104.0**	41.79**	103.8**
	*	*	*	*
	(6.969)	(7.880)	(6.965)	(7.876)
<i>Tlu</i>	17.13	13.98	16.38	13.36

	(12.16)	(11.10)	(12.16)	(11.10)
$PE_{industry}$	2.095** *	0.813* *	2.033** *	0.768* *
	(0.452)	(0.459)	(0.454)	(0.460)
Fixed Effects	NO	YES	NO	YES
Observations	833	833	833	833

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

4.3 Further analysis

4.3.1 Robustness checks

To account for the effect of stock market ups and downs on the IPO underpricing rate, the *UP* adjustment is made by subtracting the first-day change from the change in the market index change on that day, as in Section 3.2. Two adjustment methods are explained in Appendix 1. The adjusted results are shown in Table 4, where columns 1-2 are from method (1), and column 3-4 are from method (2).

In addition, the results for the SSE STAR market only are reported in column 5-6, since the STAR board is the first to adopt the registration-based reform and from which the largest sample is drawn. From the results, we find that the significance and positivity of the effect of the main variables remain unchanged, suggesting that the results remain robust after replacing *UP*.

Last but not least, we use the method of propensity score matching (PSM) and report the results in Table 5. All results remain robust and further tests for balancing assumption and common support are report in Appendix 2, Table A1 and Figure A1.

Table 4

Robustness check results: Adjusted underpricing rate

Variable	(1)	(2)	(3)	(4)	(5)	(6)
e	aUP_1		$aUP_{\textcolor{red}{i}} 2$		SSE STAR market only	
IPO_C	32.32** *		32.27** *		31.58** *	
	(7.984)		(7.982)		(12.06)	
IPO_{NC}		53.37** *		53.35** *		40.27**
		(10.50)		(10.50)		(15.88)
$IPO_{\textcolor{red}{i}}$		26.07** (10.14)		26.02** (10.14)		-25.41 (16.08)

						-0.548
<i>Leverag</i>	0.805** *	0.583** (0.244)	0.807** *(0.244)	0.583** (0.248)	0.725** (0.327)	(0.335)
<i>Asset</i>	52.40** *	33.28** (6.046)	52.37** *(5.403)	33.24** (6.044)	40.94** (5.402)	25.83** (8.074)
<i>EPS</i>	-2.415 (2.506)	-	-2.432 (2.505)	-	0.717 (3.313)	-1.422 (3.323)
<i>First_holde</i>	-0.180 (0.265)	-0.151 (0.273)	-0.182 (0.265)	-0.151 (0.273)	-0.721* (0.409)	-0.518 (0.421)
<i>State_own</i>	38.17** (14.87)	40.80** *(15.29)	38.26** (14.86)	40.87** (15.29)	47.58** (21.10)	40.41* (21.64)
<i>Raise</i>	129.6** *	101.7** (6.298)	129.5** *(5.686)	101.7** *(6.296)	109.3** *(5.685)	84.83** *(8.873)
<i>Tlu</i>	10.22 (7.863)	8.826 (8.108)	10.22 (7.860)	8.816 (8.107)	3.240 (12.35)	0.104 (12.76)
<i>PE_{industry}</i>	1.092** *	1.075** *(0.275)	1.092** *(0.284)	1.075** *(0.275)	0.840** *(0.284)	0.944** *(0.410)
Fixed Effects	YES	YES	YES	YES	YES	YES
Observations	1,312	1,312	1,312	1,312	1,312	1,312

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 5

Robustness check results: Propensity score matching (PSM)

Dependent Variable: <i>UP</i>	(1)	(2)
<i>IPO_C</i>		-32.15*** (8.327)
<i>IPO_{NC}</i>		-51.65*** (10.13)
<i>IPO_U</i>		-26.90*** (9.286)

<i>Leverage</i>	-0.356 (0.271)	-0.349 (0.272)
<i>Asset</i>	30.29*** (6.199)	29.81*** (6.152)
<i>EPS</i>	-6.316*** (2.318)	-6.259*** (2.310)
<i>First_{holder}</i>	0.0692 (0.298)	0.0544 (0.298)
<i>State_{own}</i>	29.60 (23.10)	28.38 (23.11)
<i>Raise</i>	-88.48*** (7.680)	-88.34*** (7.676)
<i>Tlu</i>	2.033 (8.114)	1.855 (8.156)
<i>PE_{industry}</i>	1.291*** (0.330)	1.258*** (0.329)
Fixed Effects	YES	YES
Observations	1,312	1,312

4.3.2 Heterogeneous effect

For heterogeneity, as shown in Table 6, M represent the dummy variables that classify the sample into subgroups with different characteristics, i.e., the age of listing, the asset size and return on assets of the firms, and also the economic development of the province. The coefficients of the interaction terms indicate that there is no statistically significant difference between the subgroups, thus confirming **H3**.

Table 6
Results of heterogeneous effects

Dependent Variable:	(1)	(2)	(3)	(4)
<i>UP</i>				
<i>M</i>	Firm's age	Asset size	Return on assets	Economic development
<i>IPO_C × M</i>	13.32 (15.58)	-21.14 (15.87)	17.42 (15.70)	-3.808 (16.14)
<i>IPO_C</i>	-58.64** (24.98)	-8.242 (24.55)	-65.45*** (25.33)	-36.80*** (12.58)
<i>M</i>	-16.56* (-16.56)	8.079 (8.079)	-17.54 (-17.54)	-13.49 (-13.49)

	(9.631)	(11.76)	(11.31)	(30.25)
$IPO_{NC} \times M$	10.40	-28.31	27.49	4.713
	(19.69)	(19.99)	(19.69)	(19.96)
IPO_{NC}	-61.82*	-5.031	-88.14***	-48.76***
	(31.64)	(30.79)	(31.62)	(14.88)
M	-14.69*	5.795	-17.10*	-9.133
	(8.447)	(10.60)	(10.04)	(29.51)
$IPO_{i} \times M$	12.32	-6.685	0.339	-19.85
	(19.20)	(19.28)	(19.28)	(19.85)
IPO_{i}	-30.64	-2.872	-12.55	-1.347
	(31.12)	(29.27)	(31.58)	(14.83)
M	-15.36*	0.417	-10.91	-4.436
	(8.672)	(10.65)	(10.21)	(30.28)
<i>Controls</i>	YES	YES	YES	YES
Fixed Effects	YES	YES	YES	YES
Observations	1,315	1,315	1,315	1,315

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

5. Conclusion and policy implications

In this paper, we select a sample of 1,315 listed companies in four sectors of China's A-share market from July 2019 to December 2023, and study the impact of the government certification of "Sophisticated and Specified Enterprises" on the IPO underpricing rate. The conclusions of the study are as follows: First, if a firm obtains the government certification of SSE before listing, its IPO underpricing rate will be significantly reduced; Second, the higher the level of government certification, the more the IPO underpricing rate will be reduced. In other words, the market is more interested in the national certification, i.e., the "Little Giant" certification; Third, there are no significant differences in the effects in different subsamples classified by listing age, asset size, return on assets, and regional economic development.

According to our findings, government certification reduces information asymmetry and thus market speculation. For central and local governments, more forms of certification should be carried out, while the certification and evaluation of enterprises should be more standardized and prudent, and the evaluation standards from local governments should be universal. For enterprises, it is recommended to actively disclose information related to government certification.

Declaration of Competing Interest

No potential conflict of interest was reported by the author(s).

Data availability

Data will be made available on request.

Acknowledgements

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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Appendix

1. Two adjustment methods are used: (1) the first-day change of all samples is subtracted from the CSI 800 index³, which can represent the rise and fall of the stock market; (2) The samples are divided by board and subtracted from the indexes representing the corresponding board, where the CSI 800 index is used for the Main Board and the Growth Enterprise Index⁴ is used for the Second Board. For the SSE STAR Board and the BSE, since there is no suitable market index to measure the early listings, so the CSI 800 index is adopted for them. The STAR 50 index⁵

³ China Security Index 800. The index is a capitalization-weighted stock market index designed to replicate the performance of the top 300 stocks traded on the Shanghai Stock Exchange and the Shenzhen Stock Exchange.

⁴ Growth Enterprise Index (GEI) is officially released by the Shenzhen Stock Exchange (SZSE) on June 1, 2010. It constitutes the core indexes reflecting the operation of stocks listed on the SZSE.

⁵ Science and Technology Innovation Board 50 Index, released by Shanghai Stock Exchange (SSE) on 31st, December 2019. The Index is comprised of the 50 largest companies listed on the SSE Science and Technology Innovation Board (STAR Market) as determined by market capitalization and liquidity.

and the Beijing Stock Exchange 50 index⁶ are adopted for the later listings.

2. Table A1 shows the results of the matching were tested for the balancing assumption. Most of the %bias values of the variables after matching were small and none of the t-values rejected the assumption that there is no systematic bias in both the treatment and control groups. In addition, the standard deviations of all variables were reduced after matching. The results for IPO_{NC} and IPO_{red} are also evidence of the same assumption and are omitted for reasons of space. Figure 1 pictures three common support tests of IPO_C , IPO_{NC} , IPO_{red} , and most treated and control groups share the common support in matched samples.

Table A1
PSM - Balancing assumption test

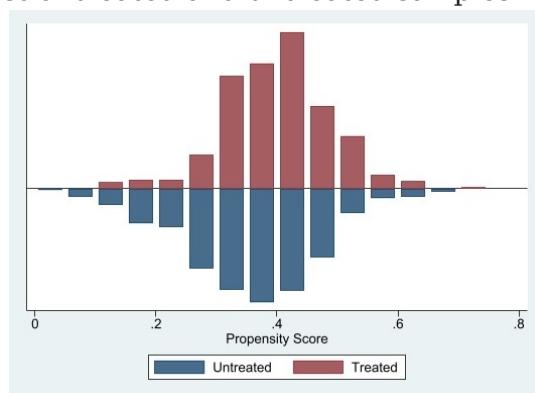
Treated Variable:	Mean						t-test		
	IPO_C /	Unmatched / Matched	Treated d	Control l	%bias s	%redu ct bias	t	p> t	V(T)/ V(C)
<i>Leverage</i>	U	36.267	37.379	-6.6			-1.13	0.25 9	0.78*
	M	36.267	35.955	1.8	71.9	0.3	0.76 7		0.87
<i>Asset</i>	U	1.9897	2.3345	-36.2			-6.1	0	0.52*
	M	1.9897	1.9719	1.9	94.8	0.35	0.72 8		0.94
<i>EPS</i>	U	1.2012	1.099	7			1.15	0.25 0.90 2	0.32*
	M	1.2012	1.1906	0.7	89.6	0.12			0.40*
<i>Firstholder</i>	U	33.292	34.338	-7.2			-1.24	0.21 4	0.79*
	M	33.292	33.242	0.3	95.2	0.06	0.95 5		0.94
<i>State_{own}</i>	U	0.0472 3	0.1014 5	-20.8			-3.49	0.00 1	.
	M	0.0472 3	0.0415 1	2.2	89.5	0.43	0.66 5		.

⁶ Beijing Stock Exchange 50 Index. Launched in September 2021 as a way to improve financing for China's small and medium-sized enterprises (SMEs), specifically those considered innovation-based by the exchange, the index tracks the stock performance of 50 of the largest companies listed on the BSE.

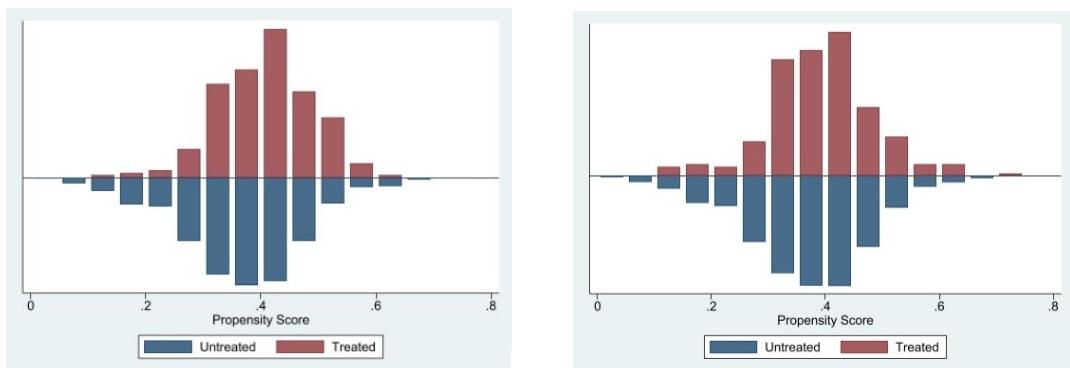
<i>Raise</i>	U	1.7331	1.9867	-24.9		-4.34	0	0.93
	M	1.7331	1.7456	-1.2	95	-0.2	0.83 9	1.16
<i>Tlu</i>	U	0.4579 1	0.5181 2	-12.1		-2.11	0.03 5	.
	M	0.4579 1	0.4490 4	1.8	85.3	0.28	0.78 1	.
<i>PE_{industry}</i>	U	33.47	36.682	-20.3		-3.52	0	0.81*
	M	33.47	34.217	-4.7	76.8	-0.77	0.44 1	0.96

Figure A1

Common support test of treated and untreated samples



IPO_C



IPO_{NC}

IPO_i